

MATHIS BOUFFARD

✉ mathis.bouffard@umontreal.ca • [GitHub](#) • [Website](#)

EDUCATION

UNIVERSITÉ DE MONTRÉAL

Master's (M.Sc.) in Physics

Sep. 2024 -

MCGILL UNIVERSITY

Bachelor of Science (B.Sc.) - Major Physics

Sep. 2021 - Apr. 2024

RESEARCH EXPERIENCE

MASTER'S IN PHYSICS

Atmospheric Characterization of the TRAPPIST-1 Planets through High-Dispersion Infrared Spectroscopy

Sep. 2024 -

Université de Montréal

Supervisors: Prof. René Doyon & Prof. Nicolas Cowan

I am conducting an analysis of multiple SPIRou and NIRPS spectroscopic datasets of the exoplanets in the TRAPPIST-1 system. I aim to constrain the abundance of greenhouse gases such as H₂O, CO₂ and CH₄ in their atmospheres.

TROTTIER INSTITUTE FOR RESEARCH ON EXOPLANETS (IREX) SUMMER INTERNSHIP

High Resolution Transmission Spectroscopy of the TRAPPIST-1 Planets

May 2024 - Aug. 2024

McGill University

Supervisors: Prof. Nicolas Cowan & Dr. Vigneshwaran Krishnamurthy

I analyzed SPIRou spectroscopic observations of the transiting exoplanet TRAPPIST-1 b to characterize its atmosphere. I performed a statistical assessment of the results, concluding with a non-detection of CO₂.

HONOURS RESEARCH THESIS

High Resolution Transmission Spectroscopy of TRAPPIST-1 b

Sep. 2023 - Apr. 2024

McGill University

Supervisors: Prof. Nicolas Cowan & Dr. Vigneshwaran Krishnamurthy

I adapted the STARSHIPS data reduction pipeline to work with Earth-sized exoplanets and implemented a telluric correction package tailored for observations from the IRD spectrograph.

TROTTIER INSTITUTE FOR RESEARCH ON EXOPLANETS (IREX) SUMMER INTERNSHIP

High Resolution Spectroscopy of Transiting Hot Jupiters

May 2023 - Aug. 2023

Université de Montréal

Supervisor: Prof. Björn Benneke

I performed data reductions of observations from the NIRPS & HARPS spectrographs as well as cross-correlation with atmosphere models to characterize the atmospheric compositions of the exoplanets WASP-178 b and WASP-189 b. I helped the NIRPS scientific team in Montréal to optimize their data reduction pipeline and adapted it to the HARPS instrument.

AWARDS

STUDENT INVOLVEMENT SCHOLARSHIP

500\$

May 2026

Université de Montréal Department of Physics

HUBERT-REEVES SCHOLARSHIP

3000\$

Nov. 2025

Université de Montréal Department of Physics

TROTTIER RESEARCH EXCELLENCE GRANT

9000\$

May 2024 - Aug. 2024

Trottier Institute for Research on Exoplanets

J.W. MCCONNELL SCHOLARSHIP

3000\$

Sep. 2021 - Apr. 2022

McGill University

PRESENTATIONS

HORS3S

TRAPPIST-1 in High Resolution: Constraining Rocky Exoplanet Atmospheres Amid Systematics [poster]

July 2026

Granada, Spain

CANADIAN ASTRONOMICAL SOCIETY ANNUAL MEETING

TRAPPIST-1 in High Resolution: Constraining Rocky Exoplanet Atmospheres Amid Systematics [poster]

June 2026

Université de Montréal, Canada

ASTROPIZZA

Characterization of SN 2025coe

Mar. 2026

Université de Montréal, Canada

CENTER FOR RESEARCH IN ASTROPHYSICS OF QUEBEC ANNUAL MEETING

Constraining the Atmospheres of TRAPPIST-1 b and e at High Spectral Resolution

May 2025

Saint-Alexis-des-Monts, Canada

ASTROPIZZA

A CO₂ exosphere on Ganymede

Oct. 2024

Université de Montréal, Canada

TROTTIER SPACE INSTITUTE SUMMER UNDERGRADUATE RESEARCH SHOWCASE

Hiking Through the Spectral Forest: The TRAPPIST-1 System at High Resolution
Honourable Mention.

Aug. 2024

McGill University, Canada

IREX SUMMER INTERNS FINAL PRESENTATIONS

Hiking Through the Spectral Forest: The TRAPPIST-1 System at High Resolution

Aug. 2024

Université de Montréal, Canada

9TH EMERGING RESEARCHERS IN EXOPLANET SCIENCE SYMPOSIUM

Hiking Through the Spectral Forest: The TRAPPIST-1 System at High Resolution

July 2024

Cornell University, USA

HONOURS RESEARCH THESIS DEFENSE

High Resolution Transmission Spectroscopy of TRAPPIST-1 b, e & f

Apr. 2024

McGill University, Canada

IREX SUMMER INTERNS FINAL PRESENTATIONS

High Resolution Spectroscopy of Transiting Hot Jupiters

Aug. 2023

Université de Montréal, Canada

SKILLS

SCIENTIFIC PROGRAMMING

Python | Git (version control) | High-performance computing on Linux clusters

LIBRARIES

NumPy | Matplotlib | SciPy | Astropy | emcee

EXOPLANET DATA ANALYSIS

High resolution spectroscopy | Atmospheric retrievals

OTHER TOOLS

L^AT_EX | Microsoft Office Suite

OBSERVATION (SUPPORT ASTRONOMER)

ESO 3.6 m (La Silla), NIRPS & HARPS – 7 on-site nights + 2 remote nights |

OBSERVATION (QUALITY CONTROL)

Mont-Mégantic Observatory – 2 nights

LANGUAGES

APERO (NIRPS data reduction pipeline) monitoring – 3 weeks

French (native) | English (bilingual)

TEACHING EXPERIENCE

TEACHING ASSISTANT

PHY 1973 - Astrobiology

Answering questions from the students, grading.

Jan. 2026 - Apr. 2026

Université de Montréal

TEACHING ASSISTANT

PHY 1234 - Introduction to Numerical Methods in Physics

Assisting students in completing their programming labs, grading.

Sep. 2024 - Dec. 2024

Université de Montréal

COMMITTEES

EQUITY, DIVERSITY AND INCLUSION (EDI) COMMITTEE

Trottier Institute for Research on Exoplanets (IReX)

I lead initiatives to promote EDI within IReX. I gave a lecture on persistence in physics majors, with a focus on gender and ethnic diversity.

Feb. 2025 -

Université de Montréal

MISSION & VISION COMMITTEE

Emerging Researchers in Exoplanet Science (ERES) Symposium

By leading and participating in focus groups, I contribute to the development of mission and vision statements that will serve as guidelines for future ERES symposiums.

June 2024 - Apr. 2025

Online

STARSHIPS COLLABORATION

Developer

I contribute to the development and maintenance of STARSHIPS, a data analysis pipeline for high resolution spectroscopic observations of exoplanet atmospheres. We presented a workshop on high resolution data analysis at the 2025 ExoSLAM summer school.

May 2024 -

Université de Montréal

TRAINING

EXOSLAM SUMMER SCHOOL

From light to knowledge: data reduction and analysis techniques for exoplanet atmosphere characterization

July 2025

Université de Montréal, Canada

CENTRE FOR RESEARCH IN ASTROPHYSICS OF QUEBEC SUMMER SCHOOL

Scientific Machine Learning Applied to Astrophysical Data

June 2024

Université de Montréal, Canada

ECLIPSE AMBASSADORS TRAINING PROGRAM

Ambassador

Science communication training provided by the Trottier Institute for Research on Exoplanets in preparation for the April 2024 total solar eclipse.

June 2023

Université de Montréal, Canada

SCIENCE COMMUNICATION

À LA DÉCOUVERTE DES EXOPLANÈTES

Public lecture

Introduction to exoplanets in the context of my research project on TRAPPIST-1 b.

Oct. 2025

Vaudreuil-Dorion library, Vaudreuil-Dorion, Canada

AGENCE DE VOYAGES INTERSTELLAIRES

Public lectures (2)

Workshops introducing the diversity of exoplanets to groups of French-language learners.

July 2025

Université de Montréal, Montréal, Canada

ASTRAGORA

Member of the astrophysicists' team

I manage and moderate a Discord server where young people across the French-speaking world engage with astrophysicists. We also give presentations in high school classrooms.

May 2025 -

Online

SPRINTS DE SCIENCE

I lead workshops guiding high school students through astrophysics research projects.

Feb. 2025 -

Online

RESEARCHERS' NIGHT

Trottier Institute for Research on Exoplanets booth

I presented my research to members of the general public through an interactive demonstration on spectroscopy.

Nov. 2024

Espace pour la vie, Montréal, Canada

INITIASCIENCES

I prepare and lead workshops on the scientific method for high school and cégep students.

Sep. 2024 -

Montréal, Canada

UNE ÉCLIPSE TOTALE À MONTRÉAL

Public lecture

Introduction to eclipses and tips for safe observation in preparation for the April 2024 total solar eclipse.

Mar. 2024

Sylvain-Garneau library, Laval, Canada

WORK EXPERIENCE

LAVAL PUBLIC LIBRARIES

Library assistant

I sort and shelve books and facilitate loans and returns. I inform users of services the library offers and help them find specific titles.

Dec. 2022 -

Laval, Canada

ARCHAMBAULT

Service clerk / Bookseller

I guided clients to the products they were looking for and made recommendations for books, board games and toys. I also created product displays (on shelves, on tables).

June 2019 - Oct. 2022

Laval, Canada

VOLUNTEERING & INVOLVEMENT

EXOCLIMES VII

Volunteer

I supported conference operations by preparing catering areas and accompanying attendees during the excursions.

July 2025

Montréal, Canada

OPEN DOOR BOOKS

Volunteer

I helped sending boxes of donated books to prison libraries throughout Canada, facilitating the prisoners' access to reading material.

June 2022 - Apr. 2023

Montréal, Canada